Volunteer Lake Assessment Program Individual Lake Reports
WEBSTER LAKE, FRANKLIN, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	11,136	Max. Depth (m):	11.8	Flushing Rate (yr¹)	1.5
Surface Area (Ac.):	612	Mean Depth (m):	5.5	P Retention Coef:	0.58
Shore Length (m):	6,900	Volume (m³):	13,586,500	Elevation (ft):	401

TROPHIC CLASSIFICATION

Year	Trophic class
1979	MESOTROPHIC
1993	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm
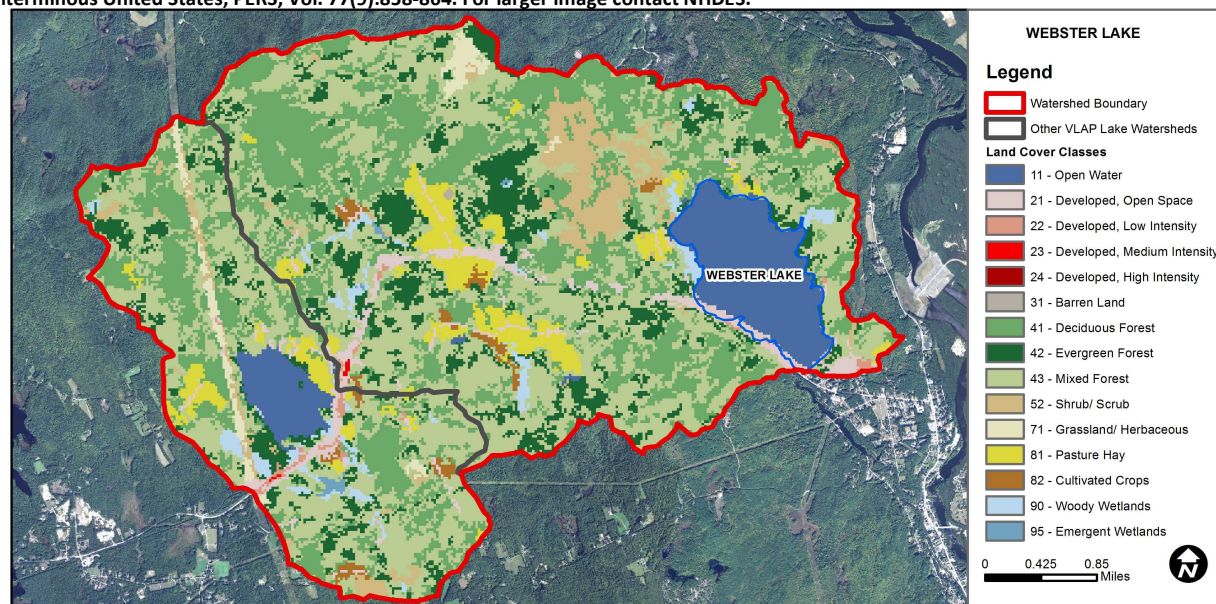
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Good	There are at least 10 samples with one, but < 10% of samples, exceeding criteria.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Good	There are at least 10 samples with one, but < 10% of samples, exceeding indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

WEBSTER LAKE - LAGACE TOWN BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.
WEBSTER LAKE - GRIFFIN TOWN BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.
WEBSTER LAKE - LAGACE TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
WEBSTER LAKE - GRIFFIN TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.

WEBSTER LAKE

Legend

Watershed Boundary
Other VLAP Lake Watersheds

Land Cover Classes
- 11 - Open Water
- 21 - Developed, Open Space
- 22 - Developed, Low Intensity
- 23 - Developed, Medium Intensity
- 24 - Developed, High Intensity
- 31 - Barren Land
- 41 - Deciduous Forest
- 42 - Evergreen Forest
- 43 - Mixed Forest
- 52 - Shrub/ Scrub
- 71 - Grassland/ Herbaceous
- 81 - Pasture Hay
- 82 - Cultivated Crops
- 90 - Woody Wetlands
- 95 - Emergent Wetlands

0   0.425   0.85 Miles

Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.45	Barren Land	0.03	Grassland/Herbaceous	1.31
Developed-Open Space	3.01	Deciduous Forest	26.81	Pasture Hay	4.8
Developed-Low Intensity	0.42	Evergreen Forest	11.42	Cultivated Crops	0.86
Developed-Medium Intensity	0.04	Mixed Forest	37.07	Woody Wetlands	1.8
Developed-High Intensity	0	Shrub-Scrub	4.61	Emergent Wetlands	0.18

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics*)

- **CHLOROPHYLL-A:** Chlorophyll levels were low and remained stable from July to Aug. and then increased in Sept.. Average chlorophyll levels increased slightly from 2013 and were slightly greater than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.

- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride levels were average and generally equal to the state median. Sucker Bk. conductivity and chloride increased slightly as the summer progress and water flows decreased in the tributary. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity since monitoring began.

- **E. COLI:** Beaver Bk., Gagnes Bk., Rt. 11 Inlet, and Sucker Bk. E. coli levels were all less than the state standard of 406 cts/100 mL for surface waters. Lake Ave Trib. experienced elevated E. coli levels in July. Subsequent E. coli sampling and bracket sampling upstream saw E. coli fall to low levels and did not indicate an upstream issue of E. coli, suggesting a more localized source. This tributary has experienced fluctuating E. coli levels for some time. Often it is difficult to pinpoint a source as E. coli can be short lived in the environment. Pet waste, such as from a dog, could be contributing as well as waterfowl that may frequent that particular area.

- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was stable and low on each sampling event and historical trend analysis indicates highly variable epilimnetic phosphorus since monitoring began. Metalimnetic (middle water layer) and hypolimnetic (lower water layer) phosphorus levels were low from June through Aug. and then increased in Sept. during the period of increased algal growth. Historical trend analysis indicates significantly decreasing (improving) hypolimnetic phosphorus since monitoring began and we hope to see this continue! Beaver Bk. phosphorus was slightly elevated in June after a rain event which could have flushed stagnant wetland water that contributed to higher phosphorus. Gagnes Bk. phosphorus levels were within an average range for that station. Rt. 11 Inlet and Sucker Bk. phosphorus levels were low and decreased from June through Sept.. Lake Ave Trib. phosphorus levels were elevated in July when E. coli levels were elevated; flow conditions were low at the time and turbidity was also slightly elevated. Phosphorus levels decreased in Aug. and Sept. during low flows and bracket sampling upstream indicated lower phosphorus levels also suggesting a more localized phosphorus source.

- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was low in June due to wave conditions, improved in July and then worsened in Aug. and Sept. when algal growth was higher. Transparency measured with the viewscope (VS) was good in June and decreased steadily as the summer progressed and likely a more accurate measure of transparency. Average transparency without the viewscope decreased slightly from 2013 but remained better than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.

- **TURBIDITY:** Epilimnetic turbidity was relatively low; metalimnetic turbidity was elevated in Sep. due to algal growth; hypolimnetic turbidity increased slightly as the summer progressed but was low for that station. Rt. 11 Inlet and Sucker Bk. turbidities were low on each sampling event. Beaver Bk. turbidity was slightly above average after a rain event. Gagnes Bk. turbidity was slightly elevated in Aug. and Sept. during low flows. Lake Ave Trib. turbidity was slightly elevated in July, Aug. and Sept. during low flows, and upstream was slightly elevated in Sept..

- **PH:** Deep spot pH levels were within desirable range 6.5—8.0 units on each sampling event; however historically deep spot pH tends to fall below desirable levels. Historical trend analysis indicates relatively stable epilimnetic pH since monitoring began.

- **RECOMMENDED ACTIONS:** Lake water quality seems to have stabilized since 2010. This is a good sign, however the lake continues to experience periodic cyanobacteria blooms during the summer. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff from roadways, steep slopes, agricultural and residential properties. Encourage the use of only phosphate free fertilizers when necessary. The source(s) of fluctuating E. coli and phosphorus levels in Lake Ave Trib. have been difficult to identify. Water quality of upstream bracket samples did not indicate a problem upstream suggesting a more localized source(s). Spikes in E. coli can often indicate wildlife, livestock or domestic animal sources. Sediments can also harbor bacteria and low flows could lead to sediment contamination that results in E. coli and phosphorus spikes. Keep up the great work!

Station Name	Table 1. 2014 Average Water Quality Data for WEBSTER LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	7.0	4.87	6	47.0		9	3.50	4.16	1.28	6.93
Metalimnion				47.6		11			1.80	6.73
Hypolimnion				48.2		12			1.89	6.82
Beaver Brook			3	29.5	10	31			2.12	6.43
Gagnes Brook			3	35.4	10	26			5.20	6.29
Lake Ave Trib			6	40.9	245	32			3.17	6.35
Lake Ave Trib Far Upstream				36.0	30	21			2.67	6.15
Rte 11 Inlet			3	20.2	33	8			0.32	6.58
Sucker Brook			9	66.6	18	10			0.69	7.00

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m^3

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.

Historical Trend Epilimnetic Conductivity and pH

Historical Deep Spot
Chlorophyll-a, Epilimnetic Total Phosphorus & Transparency Data